Notice of Allowability	Application No.	Applicant(s)	
	09/856,853	ITO, AKIHIKO	
	Examiner	Art Unit	
	Abbas I Abdulselam	2674	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *02/25/05*.

2. ☒ The allowed claim(s) is/are *24,25,27-30 and 32-46*.

3. ☒ The drawings filed on *25 May 2001* are accepted by the Examiner.

4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☒ All b) ☐ Some* c) ☐ None of the:
      1. ☒ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

XIAO WU
PRIMARY EXAMINER

DETAILED ACTION

Allowable Subject Matter

1. Claims 24-25, 27-30 and 32-46 are allowed.

Reasons for Allowance

2. The following is an examiner's statement of reasons for allowance

Scheffer et al. (USPN 5852429) teach LCD matrix display system (10) including pixels (26) and a frame period (T). See Fig 1. Scheffer teaches gray scale method of addressing display (12) including a pulse width modulation where several frame periods T of the display information are used to control the duration of the time that the pixel is "on" compared with the time the pixel is "off" (col. 25, 18-23 and 39-44). Scheffer, in connection to pulse width modulation, teaches the time "on" and "off" information state of a pixel with respect to each time interval delta (t) sub k being subdivided into G smaller time intervals delta (t) sub kg (col. 25, lines 45-67.) see Fig. 20.

Tsuchida et al. (USPN 6232938) teach graphs (Fig 17A-F) showing examples of profiles of Output Enable (OE) that is supplied from the controller (33) to the address drivers 31U, 31M, and 31D of the liquid crystal cells. Tsuchida teaches a controller (33) that supplies control signals, including clock signals and data signals, to the address drivers 31U, 31M, and 31D and data drivers 32U, 32M, and 32D.

Regarding claim 24, none of the cited prior art a teaches or suggests a driving method for an electro-optical device which performs gray-scale display of a plurality of pixels arranged in a matrix, the driving method comprising: dividing a first time period

which is part of a single time frame into a plurality of sub-fields, and in each sub-field, turning on or off &f-each pixel by applying to the pixel one of two-level signals for a period of the sub-field, the cumulation of on periods during the first time period of the single time frame being variably controlled in accordance with a gray scale level of the pixel for the gray-scale display; and applying an effective voltage to the pixels in a second time period, the second time period being dispersed in the period of the single time frame, in accordance with a threshold voltage of a transmissivity characteristic relative to a voltage applied to electro optical material used in the electro-optical device, turning on and off periods in the second time period being separated in a time period of one frame and the first time period being inserted between the turning on and off periods.

Regarding claim 30, none of the cited prior art a teaches or suggests a driving method for an electro-optical device which performs gray-scale display of a plurality of pixels arranged in the form of a matrix, the driving method comprising: dividing a first time period which is part of a single time frame into a plurality of sub-fields, and in each sub-field, turning on or off of-each pixel by applying to the pixel one of two-level signals for a period of the sub-field, the cumulation of on periods during the first time period of the single time frame being variably controlled in accordance with a gray scale level of the pixel for the gray-scale display; and turning on the pixels in a second time period, the second time period being dispersed in the period of the single time frame, in accordance with a threshold voltage of a transmissivity characteristic relative to a voltage applied to electro-optical material used in the electro-optical device, turning on and off periods in

the second time period being separated in a time period of one frame and the first time period being inserted between the turning on and off periods.

Regarding claim 36, none of the cited prior art a teaches or suggests a driving circuit for an electro-optical device, which drives pixels including pixel electrodes provided corresponding to respective intersections of a plurality of scanning lines and a plurality of data lines and switching devices for establishing conduction between the data lines and the pixel electrodes when scanning signals are supplied to the scanning lines, the driving circuit comprising: a scanning-line driving circuit for sequentially supplying, in a first time period forming part of a single time frame, the scanning signals to the respective scanning lines for every sub-field obtained by dividing the first time period into sub-fields, and for sequentially supplying the scanning signals, which make the switching devices conducting, to the respective scanning lines in a second time period of the single time frame, excluding the first time period, the second time period being dispersed in the period of the single frame; and a data-line driving circuit for supplying, in the first time period, a sequence of two-level signals, each two-level signal designating turning on or off a respective pixel for a period of a sub-field, to the data lines which correspond to the pixels in a period for supplying the scanning signals to the scanning lines which correspond to the pixels, the cumulation of on periods during the first time period of the single time frame being variably controlled in accordance with a gray-scale level of the respective pixel for a gray-scale display, and for supplying, in the second time period, a signal which designates applying an effective voltage to the pixels in accordance with a threshold value of a transmissivity characteristic relative to a voltage

applied to electro-optical material used in the electro-optical device to the data lines which correspond to the -pixels, turning on and off periods in the second time period being separated in a time period of one frame and the first time period being inserted between the turning on and off periods.

Regarding claim 38, none of the cited prior art a teaches or suggests a driving circuit for an electro-optical device, which drives pixels including pixel electrodes corresponding to intersections of a plurality of scanning lines and a plurality of data lines, and switching devices for establishing conduction between the data lines and the pixel electrodes, when scanning signals are supplied to the scanning lines, the driving circuit comprising: a scanning-line driving circuit for sequentially supplying, in a first time period forming part of a single time frame, the scanning signals to the respective scanning lines for every sub-field which is obtained by dividing the first time period into sub-fields, and for sequentially supplying the scanning signals, which make the switching devices conducting, to the respective scanning lines in a second time period of the single time frame, excluding the first time period, the second time period being dispersed in the period of the single time frame; and a data-line driving circuit for supplying, in the first period, a sequence of two level two-level signals, each two-level signal designating turning on or off of a respective pixel for a period of a sub-field, to the data lines which correspond to the pixels in a period for supplying the scanning signals to the scanning lines which correspond to the pixels, the cumulation of on periods during the first time period of the single time frame being variably controlled in accordance with a gray-scale level of the respective pixel for a gray-scale display, and for supplying, in the second

time period, a signal which designates turning on of the pixels in accordance with a threshold value of a transmissivity characteristic relative to a voltage applied to electro-optical material used in the electro-optical device to the data lines which correspond to pixels, turning on and off periods in the second time period being separated in a time period of one frame and the first time period being inserted between the turning on and off periods.

Regarding claim 39, none of the cited prior art a teaches or suggests an electro-optical-devise device, comprising: an element substrate comprising pixel electrodes corresponding to respective intersections of a plurality of scanning lines and a plurality of data lines and switching devices, being provided for the respective pixel electrodes, to control conduction between the data lines and the pixel electrodes based on scanning signals supplied through the scanning lines; an opposing substrate comprising a counter electrode being opposed to the pixel electrodes; electro-optical material held between the element substrate and the opposing substrate; a scanning-line driving circuit for sequentially supplying, in a first time period forming part of a single time frame, the scanning signals to the respective scanning lines for every sub-field which is obtained by dividing the first time period into sub-fields, and for sequentially supplying the scanning signals, which make the switching devices conducting, to the respective scanning lines in a second time period of the single time frame, excluding the first time period, the second time period being dispersed in the period of the single time frame; and a data-line driving circuit for supplying, in the first time period, a sequence of two-level signals, each two-level signal designating turning on or off a respective pixel for a period of a

sub-field, to the data lines which correspond to the pixels in a period for supplying the scanning signals to the scanning lines which correspond to the pixels, the cumulation of on periods during the first time period of the single time frame being variably controlled in accordance with a gray-scale level of the respective pixel for a gray-scale display, and for supplying, in the second time period, a signal which designates turning on or off the pixels in accordance with a threshold value of a transmissivity characteristic relative to a voltage applied to the-electro-optical material used in the electro-optical device to the data lines which correspond to the-pixels pixels, turning on and off periods in the second time period being separated in a time period of one frame and the first time period being inserted between the turning on and off periods.

Regarding claim 41, none of the cited prior art a teaches or suggests an electro-optical device, comprising: an element substrate comprising pixel electrodes corresponding to respective intersections of a plurality of scanning lines and a plurality of data lines and switching devices, being provided for the respective pixel electrodes, to control conduction between the data lines and the pixel electrodes based on scanning signals supplied through the scanning lines; an opposing substrate comprising a counter electrode being opposed to the pixel electrodes; electro-optical material held between the element substrate and the opposing substrate; a scanning-line driving circuit for sequentially supplying, in a first time period forming part of a single time frame, the scanning signals to the respective scanning lines for every sub-field obtained by dividing the first time period into sub-fields, and for sequentially supplying the scanning signals, which make the switching devices conducting, to the respective scanning lines in a

second time period of the single time frame, excluding the first time period, the second time period being dispersed in the period of the single time frame; and a data-line driving circuit for supplying, in the first time period, a sequence of two-level signals, each two-level signal designating turning on or off a respective pixel for a period of a sub-field, to the data lines which correspond to the pixels in a period for supplying the scanning signals to the scanning lines which correspond to the pixels, the cumulation of on periods during the first time period of the single time frame being variably controlled in accordance with a gray-scale level of the respective pixel for a gray-scale display, and for supplying, in the second time period, a signal which turns on the pixels in accordance with a threshold value of a transmissivity characteristic relative to a voltage applied to the electrooptical material used in the electro-optical device to the data lines which correspond to the peels-pixels turning on and off periods in the second time period being separated in a time period of one frame and the first time period being inserted between the turning on and off periods.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Abbas I Abdulselam whose telephone number is (571) 272-7685. The examiner can normally be reached on Monday through Friday from 9:00

A.M. to 5:30 P.M. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Edouard can be reached on (571) 272-7603 The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Abbas Abdulselam

Examiner

Art Unit 2674

May 5, 2005

XIAO WU
PRIMARY EXAMINER